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(54) Forced draught ovens

(57) A distributor unit A for a forced draught domestic or other oven directs the flow of hot gases throughout the oven in such a manner as to effect a relatively even distribution of heat in the oven. The distributor unit A has a back plate 25 with an opening 26, for the passage of air therethrough, substantially in alignment with the forced draught fan 19 and, on its rear surface, a set of vanes 28 radiating outwardly from the fan 19, the inner ends of the vanes 28 preferably having but a small clearance from the blades of the fan 19.

When used in a gas oven, the unit A has a front plate 22 cooperating with the back plate 25 to provide a U-shaped box through which hot gas passes upwardly from a burner.

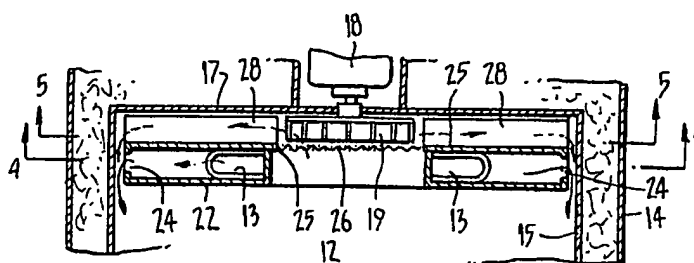


FIG. 3.

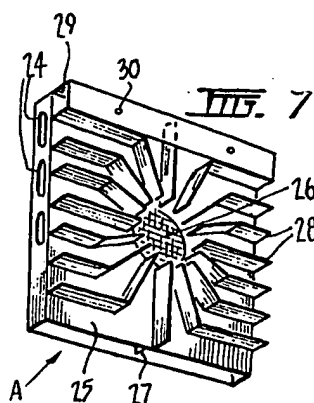
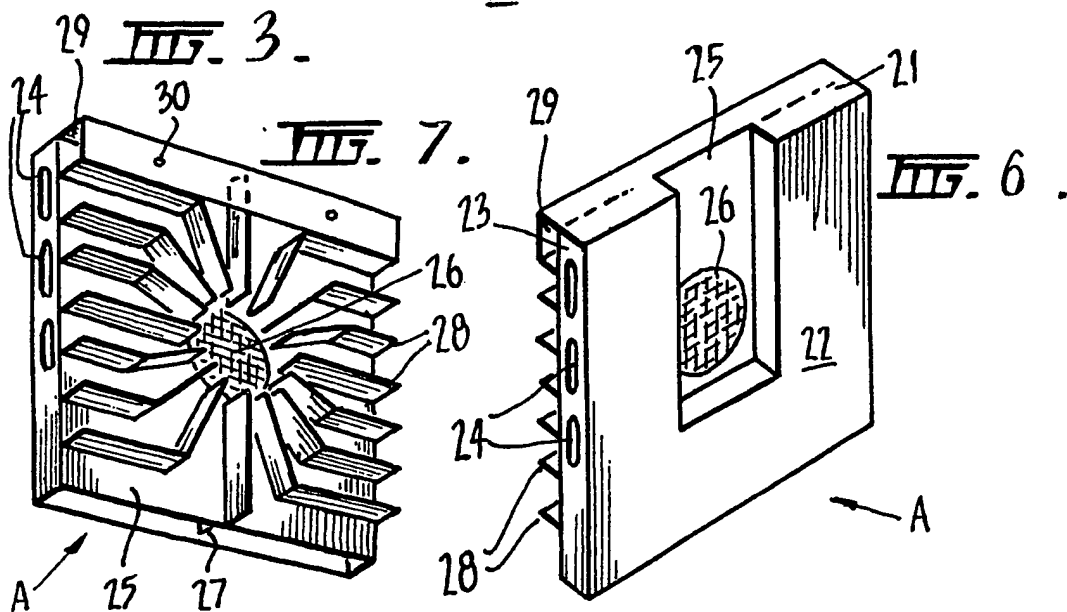
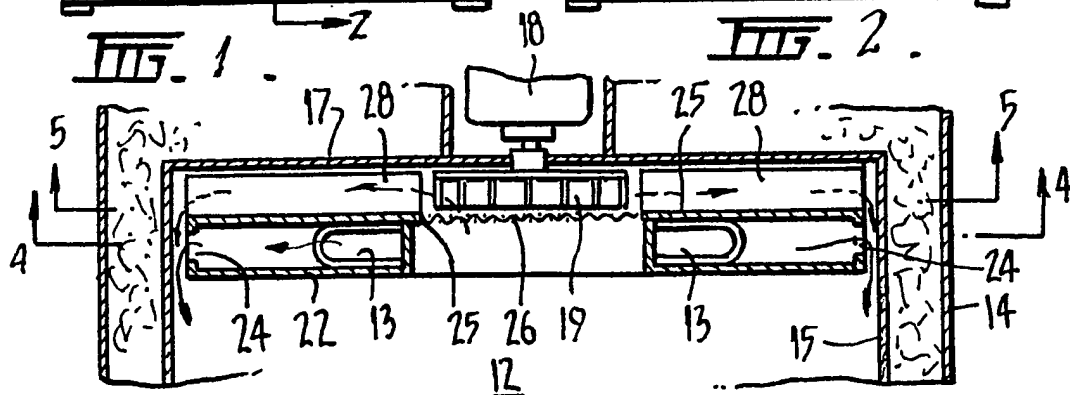
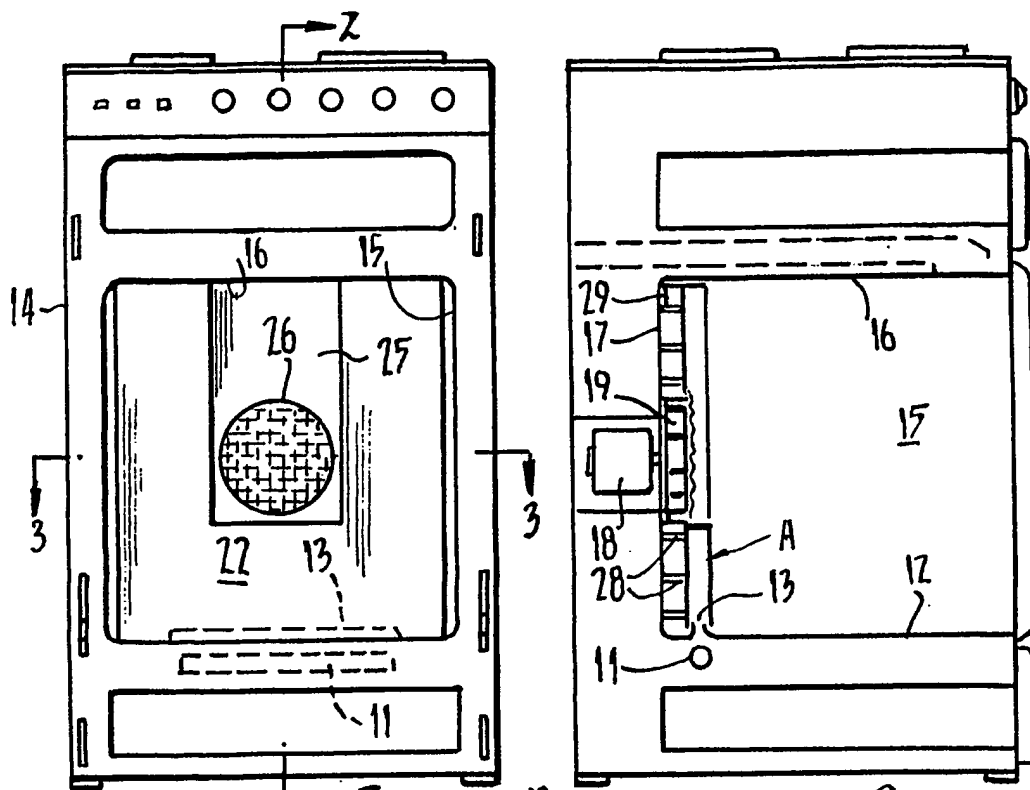


FIG. 7.

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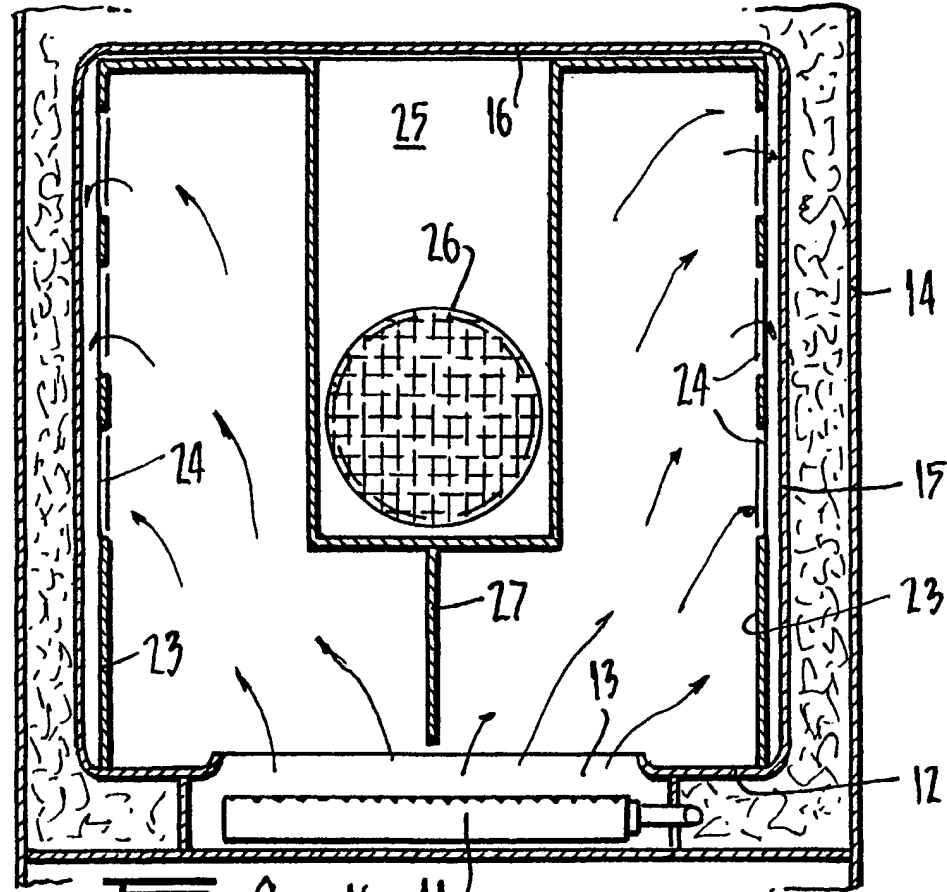
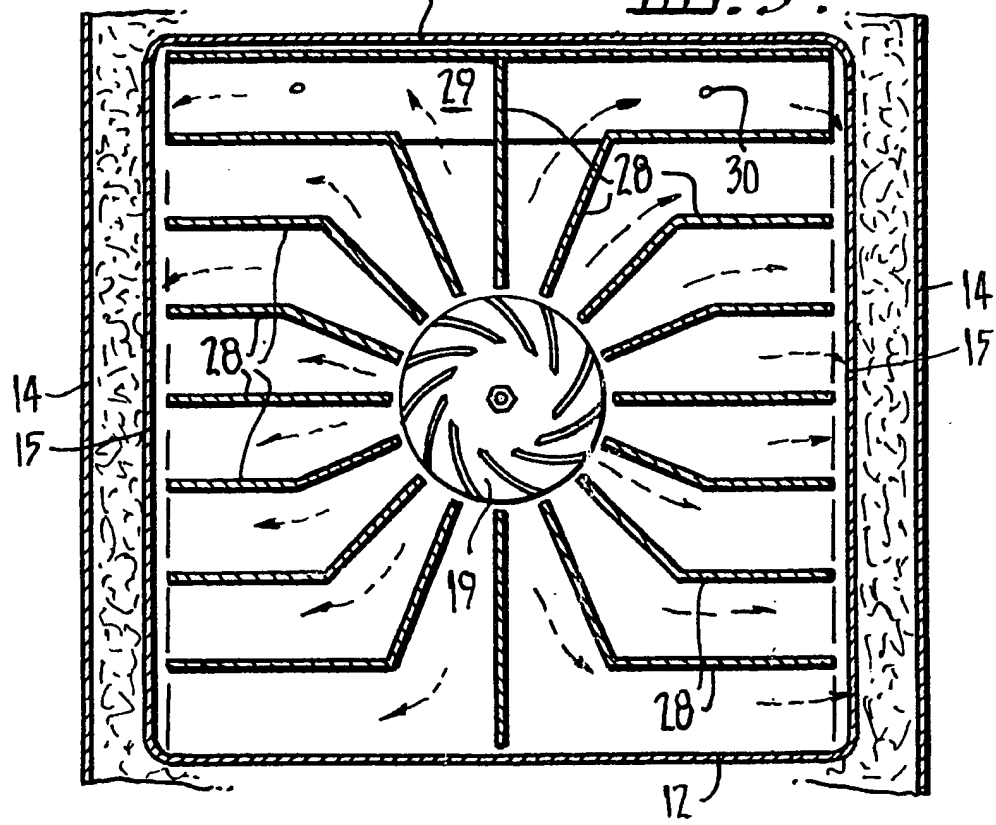


FIG. 4.

FIG. 5.



SPECIFICATION

Improvements in ovens

- 5 This invention refers to improvements in ovens and it relates in particular to improvements in cooking ovens, especially - though not exclusively - domestic ovens.

It is known to provide convection ovens having fan means to provide a forced draught, and wherein the fan is mounted at the rear of the oven behind a plate which extends across at least a major part of the oven, there being an opening or "eye" in the plate at a location corresponding with the fan and substantially co-axial therewith. When the fan is operating there is caused a centrifugal outflow of air from the blades of the fan and we believe that such outflow of air is not entirely in a circular form but, rather, elliptical. In consequence there are developed within the oven both hot areas and cool areas, and various design and/or constructions have been proposed to effect a uniform distribution of the heat within the oven.

This invention has been devised with several objects in view. One of these is to provide means for converting a natural convection oven to a forced draught oven. Another is to provide control means for effecting an even flow of the heat from the fan to the interior of the oven. A further object is to provide, in a gas oven, an even distribution of the heat from the burners.

In one aspect of the invention devised with these and other objects in view there is provided a distributor unit made to be mounted in a substantially upright position within an oven, in association with a fan mounted at or near the rear end thereof, said distributor unit having a back plate with, at a suitable location, an opening for the passage of air through it, and a number of vanes at the rear of the distributor unit extending outwardly from the fan, the inner ends of the vanes preferably having but a small clearance from the blades of the fan.

It is preferred that the vanes extend substantially radially from the fan, and that they extend at least halfway from the circumference of the fan to the walls of the oven.

The distributor unit does not extend across the width of the oven but when positioned in the oven is of such width that at each side there is a space between the side edge of that unit and the adjacent side wall of the oven.

The invention may be used with either electric ovens or gas ovens, and the distributor unit may incorporate the associated fan as well as the vanes, and may be made for installation in an existing oven so as to convert a natural convection oven to a forced draught oven. For this latter purpose any suitable attachment means may be provided, as well as electrical connections for the fan.

In a preferred construction the distributor unit also incorporates, on the front thereof, a hot-gas distribution box having its lower end open for the reception of hot gases from a burner, and with openings in its opposite outer side walls for the passage of such

may be of somewhat U-shape in front view, with the two upright legs extending on opposite sides of said opening in the back plate of the unit.

- 70 The invention also provides an oven incorporating a distributor unit as herein set out.

In order that the invention may be readily understood and conveniently put into practical form we shall now describe a preferred construction of domestic gas oven made according to the invention, with reference to the accompanying drawings, wherein:

Figure 1 is a front view of the oven;

- 80 *Figure 2* shows a vertical longitudinal cross-section, on the line and in the direction of the arrows 2-2 of *Figure 1*;

Figure 3 shows, on enlarged scale, a partial horizontal cross-section, on the line and in the direction of the arrows 3-3 of *Figure 1*;

- 85 *Figure 4* illustrates a vertical transverse cross-section of the oven, on the line and in the direction of the arrows 4-4 as indicated in *Figure 3*;

Figure 5 illustrates another vertical transverse cross-section, on the line and in the direction of the arrows 5-5 as indicated in *Figure 3*; and

- 90 *Figures 6* and *7* are perspective views of the distributor unit, from the front and from the back, respectively.

The oven shown in these drawings is a gas oven of generally conventional design having a gas burner 11, base plate 12 having in it a flanged opening 13 above the burner 11, outer and inner side walls 14, 15, top plate 16, back plate 17 with an electric motor 18 and fan 19 mounted in relation thereto, as well as other standard parts.

- 100 According to the invention a distributor unit, indicated generally by the letter "A", is mounted immediately in front of the back plate 17 and above the burner 11, resting on the base plate 12 and having a space on each side between the inner side walls 15. The distributor unit extends to within a short distance of the top plate 16.

- Said distributor unit "A" has a box 21 of somewhat U-shape in front view with a front panel 22, outer sides 23 provided with openings 24 for the outward flow of hot gas and a back plate 25 extending right across, said back plate having a substantially central opening 26 and said box being open at the bottom to fit around the upwardly curved edges of the flanged opening 13 in the oven base plate 12 (see *Figure 3*), so that the hot gas from the burner 11 will flow through the opening 13 into the distributor box 21. Within the lower part of the box 21 is a divider plate 27 which extends to within a short distance of the open bottom of the box 21.

- 120 On the back of the back plate 25 are a number of vanes, indicated generally by the numeral 28. The inner ends of these vanes are arranged around the opening 26 in the back plate 25 and are spaced a short distance from the circumference of the tips of the blades of the fan 19. It is believed there should be just sufficient clearance between the blades, when in motion, and the inner ends of the vanes 28 to allow for thermal expansion and to ensure there is no contact between them in operation. As can be seen
- 125 of the vanes are

disposed radially in relation to the fan 19 and the inner end portions of the others are also radial, with the outer end portions of those vanes on opposite sides of the vertical centre-line disposed substantially horizontally.

At the upper end of the distributor unit "A", on the back thereof, is a mounting bracket 29 by means of which the distributor unit may be fastened in position within the oven, screws 30 being fitted through the oven back plate 17 and engaged in the bracket 29. The distributor unit A, being held at the bottom by the flange of the opening 13 and at the top by said screws 30, is thus securely held in position in the oven.

It is believed that in operation the vanes will control the flow of heated gas expelled from the fan so as to cause that gas to flow outwardly in a relatively even manner and thereby to effect a relatively even distribution of heat throughout the oven, so that there will be, really, no hot areas and no cool areas within the oven.

As shown, the opening 26 in the distributor plate 25 is circular, with a layer of mesh across it, and is a diameter a small amount smaller than the distance between the upward arms of the box 21. Further, there are three openings 24 in each of the outer sides 23 of said box, two in the upper part of each side and one in the lower part. Although we have illustrated the construction of distributor we have found to be most efficient for our purposes, for use with petroleum gas, it is to be understood that with different types of gas - as with coal gas - with different designs of oven and when the invention is applied to electric ovens modifications may be required in details of design and construction. Thus, the number and/or arrangement of the vanes 28 may require modification, as may the shape and/or size of the box 21 and the opening 26, as well as the number and/or arrangement of the openings 24 and the spacing of the distributor A from the inner walls of the oven. Also, the clearance between the inner ends of the vanes and the tips of the fan blades may be greater than indicated.

When the invention is applied to a unit for installation in an existing convection flow oven the distributor unit is provided with brackets to enable it to be installed in the oven and the fan is mounted on the rear surface thereof as a unit. Suitable electrical connections for the fan are provided for mounting in the wall of the oven.

CLAIMS

1. A distributor unit adapted to be mounted in a substantially upright position within an oven, in association with a fan mounted at or near the rear end thereof, said distributor unit having a back plate with, at a suitable location, an opening for the passage of air through it, and at the rear of the distributor unit a number of vanes extending outwardly from the fan.

2. A distributor unit as claimed in Claim 1 wherein the middle of said opening is substantially co-axial with the axis of rotation of said fan.

3. A distributor unit as claimed in Claim 1 wherein the middle of said opening is substantially co-axial with the axis of rotation of said fan.

Claim 2 wherein the inner end portions of the vanes extend substantially radially outwards from the axis of rotation of the fan, and the inner ends thereof have but a small clearance from the fan blades.

4. A distributor unit as claimed in claim 3 wherein the outer end portions of vanes on opposite sides of the vertical centre-line of the unit extend substantially horizontally.

5. A distributor unit as claimed in any of the preceding claims wherein the back plate has at least one mounting bracket for enabling the unit to be mounted within an oven.

6. A distributor unit as claimed in any of the preceding claims wherein there is, on the front of the back plate, a hot-gas distribution box having its lower end open for the reception of hot gases and with openings in its opposite outer side walls.

7. A distributor unit as claimed in Claim 6 wherein the hot-gas distribution box is of somewhat U-shape in front view with the two upright legs thereof extending on opposite sides of said opening in the back plate.

8. A distributor unit as claimed in Claim 6 or 7 wherein the open lower end of the distribution box is of a size to fit about an upwardly-flanged opening in the base of an oven through which pass heated gases from the oven burner.

9. An oven incorporating a distributor unit as claimed in any one of the preceding claims.

10. A distributor unit adapted to be mounted in an oven and being substantially as herein described with reference to the drawings.

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